

NASA ADVISORY COUNCIL
National Aeronautics and Space Administration
Washington, DC 20546
Dr. Kenneth M. Ford, Chairman

May 10, 2011

Mr. Charles F. Bolden, Jr.
Administrator
National Aeronautics and Space Administration
Washington, DC 20546

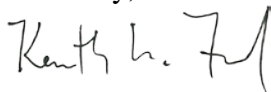
Dear Administrator Bolden:

The NASA Advisory Council held a very productive public meeting at NASA Glenn Research Center in Cleveland, Ohio, on May 5-6, 2011. We greatly appreciated the outstanding meeting support that the NASA Glenn Director, Mr. Ray Lugo, and his staff provided, as well as the excellent research tour that was arranged for us.

As a result of its deliberations, the Council approved nine recommendations, five findings, and three observations. They are enclosed for your consideration.

Thank you for the opportunity to provide our insights and advice concerning NASA and the U.S. civil space program. If you have any questions or wish to discuss further, please contact me.

Sincerely,

A handwritten signature in black ink, appearing to read "Ken M. Ford", written in a cursive style.

Kenneth M. Ford
Chairman

Enclosures

NASA Advisory Council Recommendation
Unmanned Aircraft Systems (UAS) Integration
in the National Airspace System (NAS) Interagency Roadmap
2011-02-01 (AC-01)

Name of Committee: Aeronautics Committee

Chair of Committee: Ms. Marion Blakey

Date of Council Public Deliberation: May 6, 2011

Short Title of Recommendation: UAS Integration in the NAS Interagency Roadmap

Recommendation: The Council recommends that NASA, as a member agency of the Joint Planning and Development Office (JPDO), ensure that the research, development and demonstration (RD&D) interagency roadmap activity include clear documentation on ongoing and future activities currently funded across the Government departments and agencies relating to UAS RD&D. In addition to supporting the deliverable to the Office of Management and Budget (OMB), the Council also recommends that NASA include data about international research programs on UAS's in its own planning to augment its own research considerations, even if not submitted in the report to OMB.

Major Reasons for the Recommendation: Awareness of UAS integration and research efforts being pursued across the Federal Government and internationally will allow NASA, in conjunction with other Federal agencies, to make better informed investment decisions about UAS research and technology development efforts. Such an interagency effort will also provide stakeholders and users an understanding of duplications and gaps across Government investment. NASA should also take into consideration global technology development efforts to inform its planning and to eventually support full global UAS interoperability.

Consequences of No Action on the Recommendation: Failure to do so could lead to inefficient use of U.S. Government resources as NASA invests in technologies and operational solutions that are redundant in light of other Federal Government efforts or that are incompatible with global harmonization of UAS airspace access.

NASA Advisory Council Recommendation

Feasibility of Developing Space Launch System (SLS) by 2016 2011-02-02 (EC-01)

Name of Committee: Exploration Committee

Chair of Committee: Mr. Richard Kohrs

Date of Council Public Deliberation: May 6, 2011

Short Title of Recommendation: Feasibility of Developing SLS by 2016

Recommendation: NASA should engage a competent integration contractor immediately in order to define induced environments (loads, vibro-acoustics, and thermal) and propulsion system parameters (propellant flow rates, engine pressure requirements, and required ullage pressures) the envelope design conditions for all 3 Blocks. These enveloped design conditions can then be used to size hardware that can be common to all 3 Blocks.

Major Reasons for the Recommendation: This approach will minimize expensive redesign and retest requirements as SLS progresses from Block 1, to Block 2, and Block 3.

Consequences of No Action on the Recommendation: If this recommendation is not followed, there will be deficiency in timely definition of design data for SLS and Multi-Purpose Crew Vehicle (MPCV), resulting in increased change traffic and increased cost and schedule. Furthermore, if the enveloping of induced environments of all 3 Blocks is not accomplished very early in the design phase of Block 1, unnecessary and costly design changes and associated testing will be required as NASA transitions to Block 2 and 3.

NASA Advisory Council Recommendation

Heavy Lift Capability 2011-02-03 (EC-02)

Name of Committee: Exploration Committee

Chair of Committee: Mr. Richard Kohrs

Date of Council Public Deliberation: May 6, 2011

Short Title of Recommendation: Heavy Lift Capability

Recommendation: NASA should promptly start development of a new expendable main engine by a U.S. contractor that will supply sufficient power to support a 130 MT or a greater launch vehicle capability. This new engine must support a launch vehicle schedule consistent with the need of the 130 MT launch vehicle schedule.

Major Reasons for the Recommendation: For the past 40 years, NASA has relied on the Space Shuttle Main Engines (SSME). Russia and other countries have developed main engines for their programs. New technologies and personnel resources as well as higher thrust main engine requirements are needed.

Consequences of No Action on the Recommendation: The U.S. could potentially lose its leadership in space exploration.

NASA Advisory Council Recommendation

Industrial Base 2011-02-04 (EC-03)

Name of Committee: Exploration Committee

Chair of Committee: Mr. Richard Kohrs

Date of Council Public Deliberation: May 6, 2011

Short Title of Recommendation: Industrial Base

Recommendation: The Council strongly urges that NASA work expeditiously and visibly to ensure that the industrial base supporting engine production and development is sustained and enhanced.

Major Reasons for the Recommendation: Financial support of this activity has become time critical – especially given the cancellation of the Constellation program and the end of the Shuttle era.

Consequences of No Action on the Recommendation: Without NASA's attention to this matter, the engine workforce and knowledge base could slowly decline to a point of being unable to develop new leading edge U.S. engine technology.

NASA Advisory Council Recommendation

Decadal Survey on Biological and Physical Sciences in Space 2011-02-05 (EC-04)

Name of Committee: Exploration Committee

Chair of Committee: Mr. Richard Kohrs

Date of Council Public Deliberation: May 6, 2011

Short Title of Recommendation: Decadal Survey on Biological and Physical Sciences in Space

Recommendation: NASA should appoint an Associate Administrator for the Life and Physical Sciences, charged with appropriate responsibilities and authority to ensure that integrated, coordinated and sufficient approaches to these areas are achieved in order to support the needs for future human space exploration, and to foster science developments that further the Nation's role as a leader in space-related science.

Major Reasons for the Recommendation: The budgetary consequences of the Exploration Systems Architecture Study (ESAS) process had major negative consequences on the physical and life sciences, both within NASA and in the external research community, yet advances in these areas are essential for the future of human space exploration. The Council endorses the content of the decadal report and wishes to specifically endorse the need for an integrated approach to research in the life and physical sciences within NASA, one that is supported by stable and sufficient funding that fosters advances not only within the Agency but also within the external research community. In order to foster the necessary integration and emphasis within NASA, the Council believes that a senior level administrator (i.e., Associate Administrator) is needed to manage and represent the life and physical sciences initiatives within NASA.

Consequences of No Action on the Recommendation: We will not have an integrated, coordinated approach to support human space exploration. In addition, we will not maintain the Nation's role as a leader in space related science.

NASA Advisory Council Recommendation
Lowering the Cost of Expendable Launch Services
2011-02-06 (SC-01)

Name of Committee: Science Committee

Chair of Committee: Dr. Wesley Huntress

Date of Council Public Deliberation: May 5, 2011

Short Title of Recommendation: Lowering the Cost of Expendable Launch Services

Recommendation: We recommend that NASA work aggressively to lower the cost of expendable launch services through whatever means possible. This may include block buys or other innovative approaches in the NASA Launch Services II (NLS II) contract, and pursuing alternate sources such as new commercial entries and international collaborations.

Major Reasons for the Recommendation: The new SLS II contract greatly increases the cost of launch services, resulting in loss of the number of flight missions that the NASA Science Mission Directorate (SMD) can afford.

Consequences of No Action on the Recommendation: The SMD launch rate will be reduced and there will be reductions in the science content of those missions that are launched.

NASA Advisory Council Recommendation

Re-Acquiring Reliable and Affordable Mid-Range Launch Vehicle Services 2011-02-07 (SC-02)

Name of Committee: Science Committee

Chair of Committee: Dr. Wesley Huntress

Date of Council Public Deliberation: May 5, 2011

Short Title of Recommendation: Re-Acquiring Reliable and Affordable Mid-Range Launch Vehicle Services

Recommendation: The Council recommends that NASA take urgent action to re-acquire reliable and affordable mid-range launch services (Taurus XL to Delta II class) to enable access to space by its Earth and space science flight missions.

Major Reasons for the Recommendation: There is a crisis in access to space in Earth and space science. The current stable of mid-range launch vehicles are either not reliable (Taurus XL has failed in 3 of 4 last launches), or uncertified (i.e., Minotaur, Taurus II and Falcon 9) and launch failure does NOT change the certification level!

Consequences of No Action on the Recommendation: There are NASA Science Mission Directorate (SMD) flight missions in development for which there are no reliable launch vehicles available. These will be delayed at significant cost.

NASA Advisory Council Recommendation
Communication Strategy on NASA Websites
2011-02-08 (SOC-01)

Name of Committee: Space Operations Committee

Chair of Committee: Col. Eileen Collins (USAF, Ret.)

Date of Council Public Deliberation: May 5, 2011

Short Title of Recommendation: Communication Strategy on NASA Websites

Recommendation: NASA websites convey mixed and inconsistent messages about the future direction of human exploration programs. The website needs to be reviewed and changed to ensure that the messages about the future direction of human exploration are consistent.

Major Reasons for the Recommendation: The Council noted that it is difficult to determine the current course of human spaceflight programs via nasa.gov, as there are readily accessible pages dedicated to outdated and cancelled human spaceflight programs.

Consequences of No Action on the Recommendation: Continuing confusion among both the NASA workforce and the general public on the state and direction of NASA's human spaceflight programs.

NASA Advisory Council Recommendation
**Delays in Small Business Innovative Research/
Small Business Technology Transfer (SBIR/STTR) Funding
2011-02-09 (TIC-01)**

Name of Committee: Technology and Innovation Committee

Chair of Committee: Ms. Esther Dyson

Date of Council Public Deliberation: May 5, 2011

Short Title of Recommendation: Delays in SBIR/STTR Funding

Recommendation: Request that senior Agency leadership address issues surrounding the significant delays in FY 2010 and 2011 in funding SBIR/STTR awardees and work to remedy these problems for FY 2012 and beyond.

Major Reasons for the Recommendation: The 2010 determination of severability and subsequent cascading decisions regarding bona fide need provisions and funding rules have resulted in: (1) significant delays in funding of new-start projects; (2) very small funding increments while operating under Continuing Resolutions; (3) an overall inability for NASA to meet its Congressionally-mandated annual funding obligations to small businesses; (4) reductions in the benefits NASA can gain from these projects; and (5) de-motivation of internal staff and potential partners. Since 2010, NASA issued only about 30% of the total funding intended for SBIR/STTR. Over 200 SBIR Phase 2 projects selected in October 2010 have not yet been funded as of late April 2011; normally, SBIR Phase 2 projects selected in October are initiated in December and January.

Consequences of No Action on the Recommendation: Additional delays in awards of SBIR/STTR projects which will inhibit hundreds of small businesses from beginning important research and technology development for the Agency and its missions.

NASA Advisory Council Finding

Air Traffic Management Integrated Technology Demonstrations

Name of Committee:	Aeronautics Committee
Chair of Committee:	Ms. Marion Blakey
Date of Council Public Deliberation:	May 6, 2011
Short Title of Finding:	Air Traffic Management Integrated Technology Demonstrations

Finding: The Council strongly endorses the air traffic management integrated technology demonstrations currently planned within the Airspace Systems Program. These activities will demonstrate the full potential of the Automatic Dependent Surveillance - Broadcast (ADS-B) functionality in the dense terminal area by integrating a critical set of technologies that NASA has developed and that are sufficiently mature for operational use. These activities expect to demonstrate significant savings in fuel consumption, flight time and reduced noise that would provide a strong financial incentive for operators to equip with ADS-B. This presents a major potential for NASA developed technologies to make a critical contribution to the accelerated implementation of ADS-B that is the backbone of the NextGen operating concept. The expected fuel savings would be achieved through more efficient flight paths and integrated NextGen capability for terminal operations, which will in turn increase throughput with ensured safety. The Council wants to underscore the importance of these activities and NASA's approach in engaging both air- and ground-based communities in the effort. In addition, the Council hopes that NASA will calculate in some detail the fuel savings associated with the successful implementation of these technologies into the National Airspace System.

NASA Advisory Council Finding

Global Exploration Roadmap

Name of Committee:	Exploration Committee
Chair of Committee:	Mr. Richard Kohrs
Date of Council Public Deliberation:	May 6, 2011
Short Title of Finding:	Global Exploration Roadmap

Finding: NASA's budget presently does not allow the Capabilities Architecture as currently defined to be implemented without international and interagency participation. The initiative on the Global Exploration Roadmap is a good platform for these discussions. We encourage them to continue these discussions and to begin to be more specific.

NASA Advisory Council Finding

Losses to Science in the FY 2012 Budget

Name of Committee: Science Committee

Chair of Committee: Dr. Wesley Huntress

Date of Council Public Deliberation: May 5, 2011

Short Title of Finding: Losses to Science in the FY 2012 Budget

Finding: The Administration's FY 2012 budget proposes a significant reduction in the five-year run-out of the NASA Earth and space science program relative to the FY 2011 budget. This reduction puts at serious risk NASA's ability to accomplish the goals set out in several recent Decadal Surveys for Earth and space science, undermines the Science Mission Directorate's (SMD) international collaborations, and threatens the health of the Earth and space science enterprise.

NASA Advisory Council Finding
Affordability of Small and Medium Missions

Name of Committee: Science Committee

Chair of Committee: Dr. Wesley Huntress

Date of Council Public Deliberation: May 5, 2011

Short Title of Finding: Affordability of Small and Medium Missions

Finding: Small and medium missions, which comprise a major element of the Science Mission Directorate (SMD) portfolio, are increasingly less affordable. Lower cost flight missions require prudent but less conservative mission assurance and review processes than flagship missions. A return to affordable missions requires, in part, that NASA tailor NASA Policy Directive (NPD) 7120.5 for lower cost SMD mission categories and instill this tailoring into the engineering (technical, management, cost and other factors – i.e., TCMO) review process.

NASA Advisory Council Finding

Human Spaceflight Mission Beyond Low Earth Orbit

Name of Committee:	Space Operations Committee
Chair of Committee:	Col. Eileen Collins (USAF, Ret.)
Date of Council Public Deliberation:	May 5, 2011
Short Title of Finding:	Human Spaceflight Mission Beyond Low Earth Orbit

Finding: The Council was impressed with the way Program and Center officials are dealing with the current budget environment; however, the lack of a well-defined human spaceflight mission beyond low Earth orbit appears to be creating inefficiencies in the way that limited budget dollars are being spent. We believe that a focused mission with a specific end objective, as has been the case for over 50 years, would also greatly benefit the NASA workforce, current and future domestic and international partners, and the general public.

NASA Advisory Council Observation

Unmanned Aircraft Systems (UAS) Integration in the National Airspace System (NAS) Interagency Roadmap

Name of Committee: Aeronautics Committee

Chair of Committee: Ms. Marion Blakey

Date of Council Public Deliberation: May 6, 2011

Short Title of Observation: UAS Integration in the NAS Interagency Roadmap

Observation: In response to a request from the Office of Management and Budget (OMB), NASA is working with other Joint Planning and Development (JPDO) agencies to develop a research, development and demonstration (RD&D) roadmap to provide the foundation for a technology roadmap necessary for the overall National Plan for UAS access to the NAS. The Council supports and encourages the ongoing work being conducted by NASA to support the JPDO and the Federal Aviation Administration (FAA) in the development of an interagency RD&D roadmap. NASA is also working with FAA and key stakeholders to define success and to ensure that a National Plan is created which includes (at a minimum) policy, procedures and technology.

NASA Advisory Council Observation

Feasibility of Developing Space Launch System (SLS) by 2016

Name of Committee: Exploration Committee

Chair of Committee: Mr. Richard Kohrs

Date of Council Public Deliberation: May 6, 2011

Short Title of Observation: Feasibility of Developing SLS by 2016

Observation: The only feasible way of achieving initial heavy lift launch capability by 2016 is by using a reference design block approach to development of SLS and to initiate procurement actions promptly. Carefully planned evolution from Block 1 to Block 2 and ultimately to 130 MT + Block 3 is required to ensure cost effective transition through these Blocks while minimizing overall cost of the SLS Program.

**NASA Advisory Council Observation
Decadal Survey on Biological and Physical Sciences in Space**

Name of Committee:	Exploration Committee
Chair of Committee:	Mr. Richard Kohrs
Date of Council Public Deliberation:	May 6, 2011
Short Title of Observation:	Decadal Survey on Biological and Physical Sciences in Space

Observation: The Council received a briefing on the Decadal Survey on Biological and Physical Sciences presented by Dr. Wendy Kohrt of the University of Colorado/Denver. The Council was impressed by the scope, depth and value of this extensive and detailed analysis of the state of the biological and physical sciences in space, and within NASA in particular.

The Council noted especially the value of Table 13.2 in the study, which identified the recommended research priorities for the physical and life sciences for each of the eight strategic priorities that might form the basis for additional research in these areas. In essence, this matrix provides a “road map” for research that is guided by strategy, a particularly helpful approach that could inform both broad policy decisions and specific action agendas for funding agencies, NASA and related governmental agencies.

The Council also noted that radiation did not receive a prominence in the report because the study specifically pointed out that radiation had received detailed attention in separate reports prepared by the National Academies. Further, it noted that the study charter specifically excluded detailed budget planning from the purview of this study group.